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ASSIGNMENT BOOKLET
SCN2231 Biology 20
Module 4 Assignment

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Assigned Teacher: ____________________

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Teacher's Comments

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Teacher

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- Has your work been reread to ensure accuracy in spelling and details?
- Is the booklet cover filled out and the correct module label attached?

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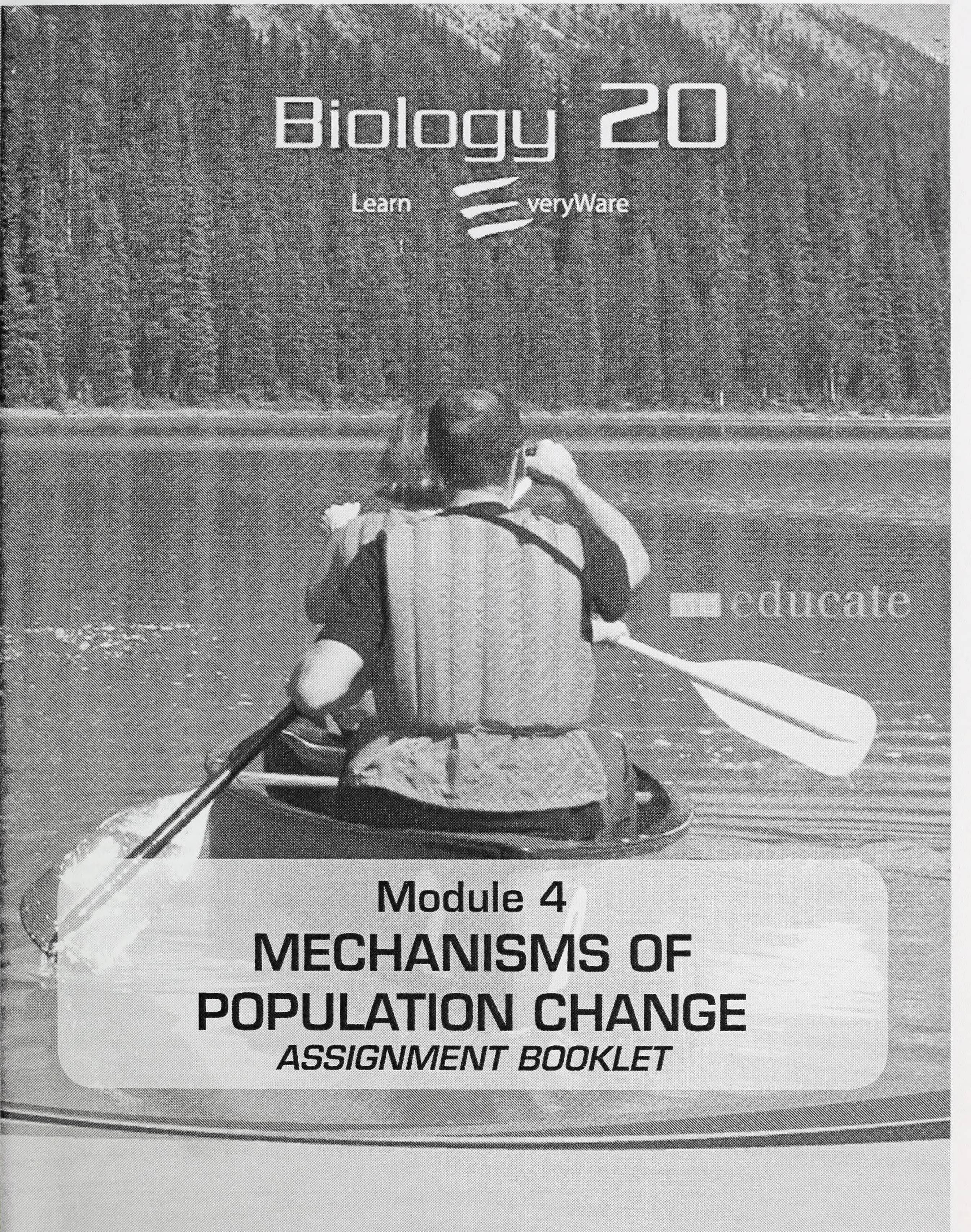

Biology 20

Learn EveryWare

educate

Module 4

MECHANISMS OF POPULATION CHANGE

ASSIGNMENT BOOKLET

FOR TEACHER'S USE ONLY

Summary

	Total Possible Marks	Your Mark
Lesson 1 Assignment	58	
Lesson 2 Assignment	48	
Lesson 3 Assignment	8	
Lesson 4 Assignment	20	

Teacher's Comments

Biology 20
Module 4: Mechanisms of Population Change
Assignment Booklet
ISBN 978-0-7741-3027-1

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Students	✓
Teachers	✓
Administrators	
Home Instructors	
General Public	
Other	

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- Alberta Education, **http://www.education.gov.ab.ca**
- Learning Resources Centre, **http://www.lrc.education.gov.ab.ca**
- Tools4Teachers, **http://www.tools4teachers.ca**

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MODULE 4: LESSON 1 ASSIGNMENT

This Module 4: Lesson 1 Assignment is worth 58 marks. The value of each assignment and each question is stated in the left margin.

(58 marks) Lesson 1 Assignment: Adaptation, Variation, and Natural Selection

TR 1. Peppered Moth Simulation

(3 marks) 1. What variation exists in the peppered moth population? Is one of these variations considered an adaptation? Explain.

(1 mark) 2. Over 200 years ago, all of the peppered moths in a certain population were light-coloured. How could the first dark-coloured moth have occurred in the population? (**Hint:** How are new variations created in populations?)

(4 marks) 3. Explain how a variation that at one time gave a selective advantage became a disadvantage when the environment changed. How did this affect the variation in the population of peppered moths?

(12 marks) Watch and Listen: Sickle Cell Anemia: An Advantage or a Disadvantage?

After completing some Internet research about the topic of sickle cell anemia, discuss, in writing or orally, the following question:

If you knew you had the sickle-cell gene would you choose to have children?

- Would the negatives prevent you from having children?
- Would the positives outweigh the negatives?

Prepare your thoughts and post them in the discussion area. How do your thoughts compare with those of your classmates? Once you have read other postings, consider your answers. Place your final response to the question in the space provide below. If you have chosen a multimedia format to present your discussion, attach it to this document or ask your teacher how you should submit it for marking.

You will be graded using the following rubric:

Sickle-Cell Activity Marking Rubric

	4	3	2	1
Positives	The student demonstrates a superior understanding of the positive aspects of the sickle-cell gene.	The student demonstrates an understanding of the positive aspects of the sickle-cell gene.	Few positive aspects of the sickle-cell gene are given.	The positive reasons are not adequate.
Negatives	The student demonstrates a superior understanding of the negative aspects of the sickle-cell gene.	The student demonstrates an understanding of the negative aspects of the sickle-cell gene	Few negative aspects of the sickle-cell gene are given.	The negative reasons are not adequate.
Opinion	The student takes a firm stand on the issues based on the positives and negatives explored.	The student takes a stand on the issue and supports the opinion.	The student takes a stand on the issue but does not support the opinion.	The student fails to take a stand on the issue.

(8 marks)

Watch and Listen: The Peacock and Natural Selection

After doing some research and/or watching a video, you should have enough information to answer the following question:

Why do male peacocks have long, beautiful tails, which make it more difficult to escape from predators?

Explain your answer using images, text, or a combination of both. Your explanation could be in the form of a comic, story, or a summary. You will be marked using the following rubric.

Peacock Activity Marking Rubric

	4	3	2	1
Accuracy of Explanation	The explanation is very accurate and detailed.	The explanation is accurate and detailed.	The explanation is accurate.	The explanation is inaccurate.
Clarity of Explanation	The explanation is very easy to interpret and understand.	The explanation is easy to interpret and understand.	The explanation is somewhat difficult to understand.	The explanation is difficult to understand.

TR 2. Selective Pressures

(2 marks) 1. Some mutations provide an organism a selective advantage in the environment and some provide a selective disadvantage. Give examples from the lesson of these different mutations.

(2 marks) 2. Organisms that reproduce sexually have an evolutionary advantage over organisms that reproduce asexually. Explain and support this statement.

Read "Insect Resistant Pests" on page 121 of the textbook.

(1 mark) 3. What selective pressure is causing the change in the insect resistance?

(2 marks) 4. Explain how some insects develop resistance to pesticides in terms of natural selection.

LAB: Finch Beak Depth

(3 marks) **Data and Observations**

Average Inches of Rainfall (inches)	Average Depth of Beak (mm)	Average Population of Finches
1		
5		
10		

Analysis

(1 mark) 1. During what part of the year does the finch population increase? Why do you think this is so?

(2 marks) 2. How did the number of finches change after the five years of drought? Why do you think this is so?

(1 mark) 3. What happens to the average beak depth after the five-year drought?

(3 marks) 4. During years of drought, the smaller, softer seeds are quickly eaten up, leaving behind only the larger, tougher seeds that are harder to crack and more difficult to find under the baked soil. What kinds of beaks are more useful in these conditions? Why? How does this information relate to your answer to question 3?

(3 marks) 5. Assuming that beak depth is a genetic trait, and that an individual finch cannot change the shape of its own beak, how did the change in average beak depth actually occur during the drought? Explain in detail.

(3 marks) 6. When rainfall is above average in the Galapagos Islands, a higher proportion of seeds are small. How does this explain the trend in beak size you observed after five years of excess rain?

Conclusion

(4 marks) 1. How did the finch population size and beak depth respond to drought years? What about in years of heavy rainfall?

(3 marks) 2. What selection pressure caused the change in beak depth? Explain.

MODULE 4: LESSON 2 ASSIGNMENT

This Module 4: Lesson 4 Assignment is worth 48 marks. The value of each assignment and each question is stated in the left margin.

(48 marks) Lesson 2 Assignment: Developing Theories to Explain Change

TR 2. Answering Darwin's Questions

(2 marks) 1. What were the two main ideas expressed in Darwin's publication *On the Origin of Species?*

(6 marks) 2. Turn to page 125 of the textbook and read the questions. These questions helped Darwin develop his ideas on evolution and natural selection. Suggest possible answers to Darwin's questions, and link them to the two main ideas that he expressed in *On the Origin of Species*. Complete three of the five questions from "Table 4.1." Each of the three questions is valued at 2 marks.

TR 3. The Pace of Evolution

(3 marks) 1. Which theory do you believe provides the best explanation for the pace of evolution? Give reasons for your answer.

(7 marks) 2. Create a table or chart that compares and contrasts the ideas of gradualism and punctuated equilibrium.

Reflect and Connect: Applying and Comparing Theories of Evolution

(2 marks) 1. A woman spends much of her time by swimming pools and, as a result, has very tanned skin. What would the hypothesis of inheritance of acquired characteristics say about the skin of her children? Why?

(4 marks) 2. Using two examples, describe how Charles Darwin used observations of the world around him to develop his hypothesis about how species might change with the passage of time.

(8 marks) 3. Imagine that you are Charles Darwin. You are living in the 1800s and writing down ideas in your journal. Describe how different scientist's ideas affect your thinking. The journal entry should be in the first person (as though you are Darwin). Include the ideas of three different scientists, and relate how they influenced your (Darwin's) thinking.

(4 marks) 4. Use a Venn diagram to compare Darwin and Lamarck's different theories of evolution.

Venn Diagram Marking Rubric

	2	1	0
Alike Features	identifies ways the two are alike	identifies correct and incorrect ways the two are alike	identifies incorrect ways the two are alike
Unique Features	identifies ways that the two theories differ	identifies correct and incorrect ways that the two differ	identifies incorrect ways that the two differ

(8 marks) 5. Read the first four paragraphs in "Thought Lab 4.3" on page 127 of the textbook. Flying fish use large pectoral fins to glide in air. Explain how Lamarck and Darwin might account for the origin of the large pectoral fins and the ability of the fish to glide. You may choose to work with a partner or by yourself to complete this question.

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Use one of the following formats to answer question 5:

- a comic strip
- a dramatic presentation
- a movie manuscript
- a children's story
- any other acceptable format approved by your teacher

Think about the following questions as you create your product:

- How would the variation of large pectoral fins occur differently according to the two different scientific theories?
- How are variations passed on to the next generation?
- Are the differences between the two theories obvious in your product?

Read this rubric to see the assignment specifications.

Comparing Theories Rubric

	4	3	2	1	0
Theory Differences	Differences between the two theories are very clear and correct.	Differences between the two theories are clear and correct.	Differences between the two theories are somewhat clear.	Differences between the two theories are unclear.	None of the questions are answered in the presentation.
Product Quality	The product is clear, organized, and creative.	The product is clear and organized	The product is understandable.	The product is not clear or not organized	The product is not clear and is disorganized.

(4 marks) 6. Lamarck suggested that organisms arise spontaneously and then become increasingly more complex. Why is this idea not supported by the theory of natural selection? Present your discussion as a podcast, as a written article, or as a graphic.

MODULE 4: LESSON 3 ASSIGNMENT

This Module 4: Lesson 3 Assignment is worth 8 marks. The value of each assignment and each question is stated in the left margin.

(8 marks) Lesson 3 Assignment: Evidence for Evolution

(8 marks) Reflect and Connect

A student is on holiday and will be away for Lesson 3. Create a summary for the student so he or she can quickly catch up without missing important information. The summary can be visual, text-based, or a combination of the two. Your review could be in an audio, written, electronic, or video format. It should review all the evidence for evolution learned about in this lesson.

If you have created a multimedia file, please attach it to this document.

Marking Guide

8 points: The summary includes main headings, relevant details, and no elaborate details. It is briefly stated in my own words.

6 points: The summary includes main headings and relevant details, briefly stated in my own words.

4 points: The summary includes main headings and relevant details, but uses the exact language of the text.

2 points: The summary includes main headings and relevant details, but also has elaborative details. It uses the exact language of the text.

MODULE 4: LESSON 4 ASSIGNMENT

This Module 4: Lesson 4 Assignment is worth 20 marks. The value of each assignment and each question is stated in the left margin.

(20 marks) Lesson 4 Assignment: How New Species Form

TR 2. Leopard Frogs: One Species or Seven?

(2 marks) 1. Explain how a frog call can be a barrier that keeps species separated.

(6 marks) 2. From the list of frog calls in Lesson 4, pick the two leopard frog species found in North America. Listen to their calls and try to describe the differences between the calls. Use print or electronic resources to describe the characteristics of each of the species and what makes them separate species. Organize this information in a table or chart of your own design.

(12 marks) Reflect and Connect

What conditions would need to be present for Peter Parker to become Spiderman or a new species? Outline a scenario in storytelling format (cartoon, creative writing piece, video, audio) that would describe how the "spiderman" species could evolve from the current population of humans. Be creative but don't get carried away; this is to be a short piece.

OR

Create your own scenario outlining the evolution of a new species using a storytelling format of your choice.

Category	4	3	2	1
Requirements The scenario presented explains how a new species is formed. Genetic variation/diversity, reproductive isolation, barriers and speciation are presented in context. This is presented in a storytelling format.	The requirements are met and exceeded.	All requirements are met.	One requirement was not completely met.	More than one requirement was not completely met.
Content	The topic is covered in-depth with details and descriptions. The subject knowledge is excellent.	Essential knowledge is included about the topic. The subject knowledge appears to be good.	Essential knowledge about the topic is included, but there are one or two factual errors.	The content is minimal, or there are several factual errors.

Once you have completed all of the questions, submit your work to your teacher.

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